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(54) Apparatus for stock rotation

(57) Apparatus for stock rotation and preferably chilling, comprising a first-in, first-out channel having an inlet 13 and outlet 14 for a series of successively introduced stock items 11, a major portion of the channel, constituting a bend between the inlet and outlet directions, preferably extending within refrigeration apparatus for chilling the stock items, the channel having an outer wall 10 which provides reaction forces the row of stock items pushed against the row end at the inlet, the reaction forces tending to index the row by one unit so as to present a stock item at the outlet. The channel preferably has split rollers 17 constituting its floor.

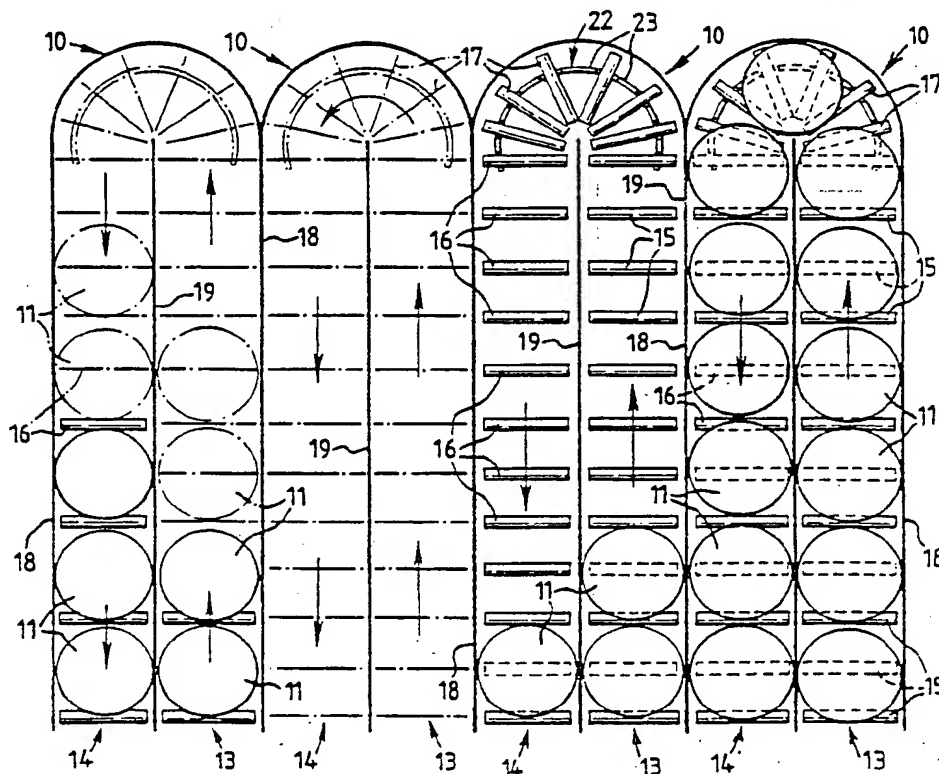


FIG. 1A

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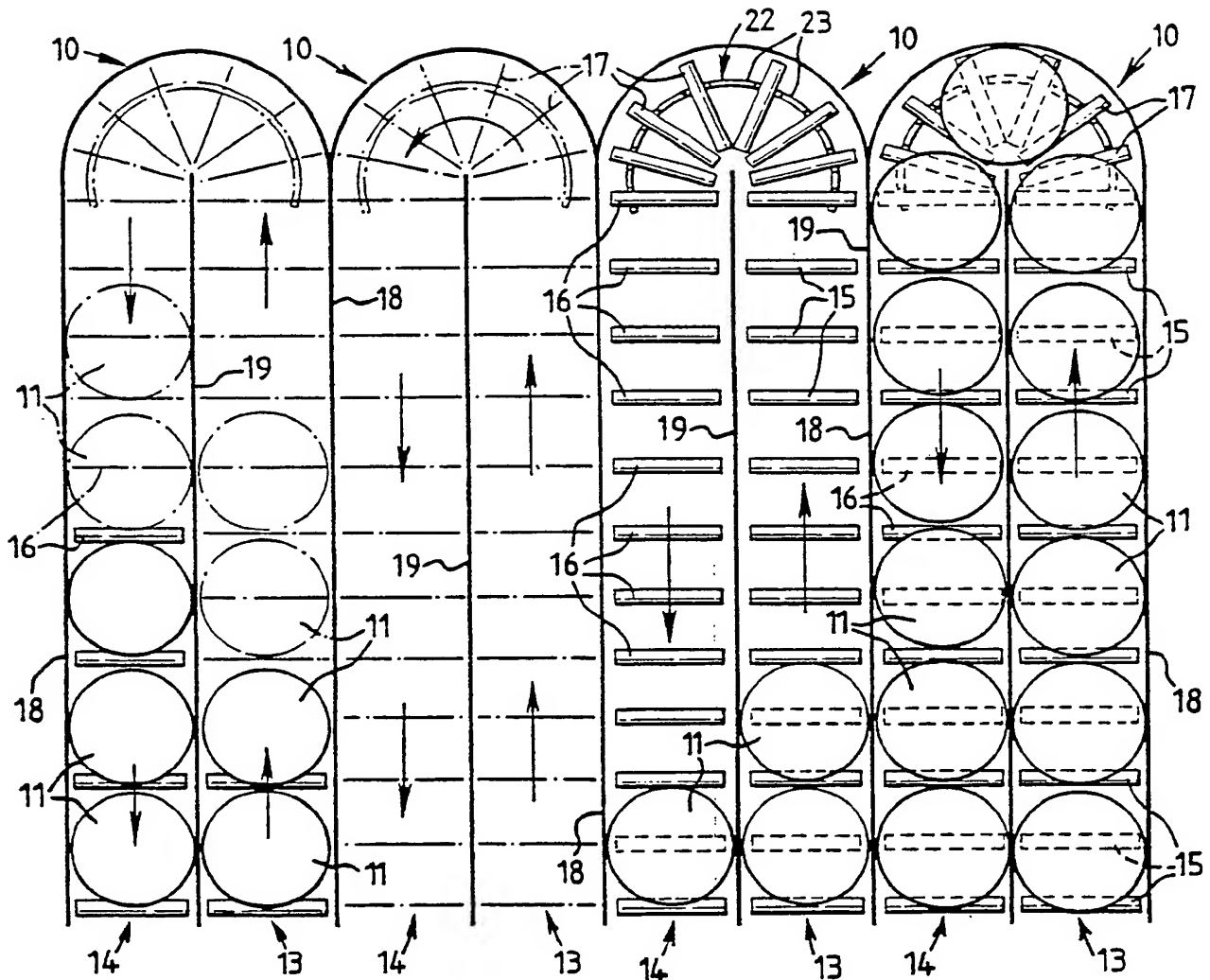


FIG. 1A

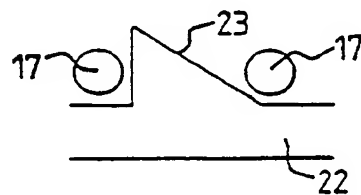
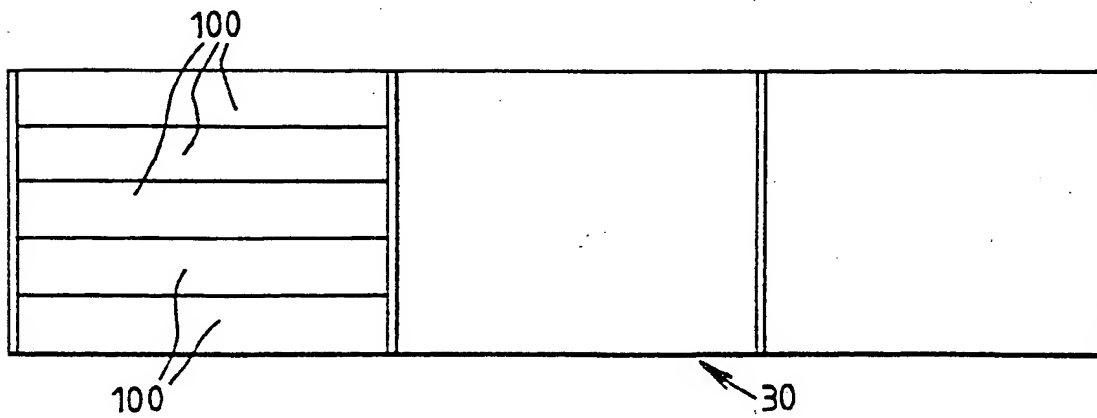
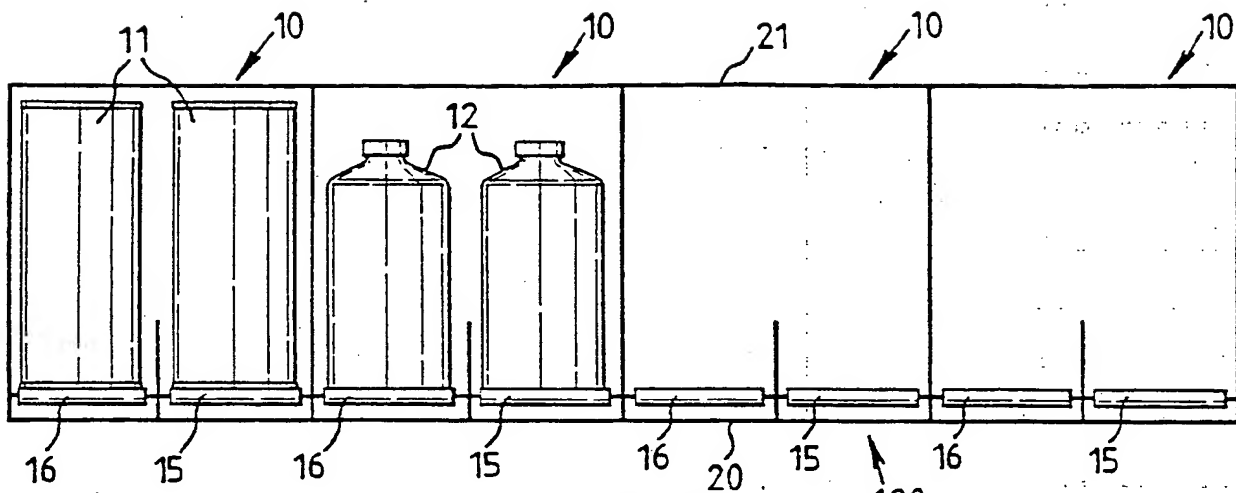


FIG. 1B



APPARATUS FOR STOCK ROTATION

This invention relates to apparatus for rotating stock items, for example beer cans or bottles, and is particularly useful for incorporation into conventional chilled cabinets and shelves in licensed premises such as public houses.

It is usual for canned drinks to be placed randomly in a particular section of a chilled cabinet. The items are then withdrawn on demand in a similar random fashion, whether by bar staff or by a purchaser. The problem with this arrangement is that there is no reliable way of ensuring that the items are chilled sufficiently before they are withdrawn. Accordingly, the purpose of the invention is to overcome this problem, but in a way which avoids the need for modification or replacement of existing chilled cabinets or shelves.

The invention provides apparatus for stock rotation comprising a first-in, first-out channel having an inlet and outlet for a series of successively introduced stock items, a major portion of the channel, constituting a bend (e.g. a half-turn) between the inlet and outlet directions; the channel having an outer wall which provides reaction forces on the row of stock items derived from the force of a newly-introduced stock item

pushed against the row end at the inlet, the reaction forces tending to index the row by one unit so as to present a stock item at the outlet.

Where the stock items require chilling, the said major portion of the channel extends within refrigeration apparatus for chilling the stock items.

This arrangement is capable of ensuring that the stock item which is withdrawn is the item which has been chilled the longest, because it will have passed through the full length of the channel. A further advantage of the use of this invention is that the arrangement may be such that no stock item can be withdrawn until such time as a replacement is inserted at the inlet, ensuring that the apparatus is maintained fully stocked. However, this is not essential: several stock items may be withdrawn from the channel adjacent to the outlet before any such items are replenished at the inlet end, if the channel is constructed so as to allow access to multiple stock items. It is also of course an advantage of this rotation of stock that no old stock is left inadvertently for long periods.

In order that the invention may be better understood, a preferred embodiment thereof will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1A is a top plan view of apparatus embodying the invention for stocking beer cans;
Figure 1B is a schematic partial view, to an enlarged scale, of the apparatus of Figure 1A;
Figure 2 is a front elevation of the apparatus of Figure 1, illustrating its use with beer cans and lager bottles; and
Figure 3 is a front elevation, to a smaller scale, of refrigeration apparatus incorporating a stack of units such as those shown in Figures 1A and 2.

The apparatus of Figures 1A, 1B and 2 consists of four identical stock rotation and chilling units placed side by side in a horizontal arrangement. The combined unit 100 may be stacked with other similar units 100, for use in refrigeration shelving or cabinets 30 as shown in Figure 3. Such shelving or cabinets 30 may be of a conventional type, having wall brackets (or the like), or rails, which are capable of supporting one or more of the composite units 100. These composite units 100 may be slid in temporarily, or may be secured more permanently.

To prevent sagging of the units under load, support is provided at several points along each edge.

Each unit 10 consists of a U-shaped channel with

straight, parallel adjacent limbs dividing at their respective ends an inlet 13 and an outlet 14. The channel is defined by a U-shaped vertical outer wall 18 and by a floor plate 20 and a top plate 21. A dividing wall 19 is optionally provided lengthwise midway between the straight portions of the outer wall 18, to ensure that stock items 11, such as beer cans or lager bottles 12, do not stray from the channel.

Stock items 11 are supported on a floor consisting of nylon or other plastics rollers 15, 16, 17 whose axes of rotation are transverse to the direction of the channel. The rollers are supported on axles whose ends are supported in the outer wall 18. At the U-shaped bend of the channel, where the channel is bent through a half turn, the outer wall 18 is semi-cylindrical, and the rollers 17 are radial so that they are still transverse to the general direction of the channel.

It is a preferred feature, although not shown in the drawings, that the rollers 17 at the U-bend especially, but preferably also the rollers 15, 16 adjacent the U-bend, and optimally all the rollers 15, 16 and 17, are each split into two shorter rollers (e.g. of equal length) arranged end-to-end, so that they are free if necessary to rotate in opposite directions. This is to accommodate turning of the cans about their vertical

axes without undue frictional resistance on their bases.

The radially-extending rollers 17 at the bend of the channel are of the same length as the other rollers 15, 16, which length is such, in relation to the radius of each roller, that there is no mutual interference at their inner ends.

A jiggling rail 22, semi-circular in plan view, with a radius of curvature matching the channel U-bend, is disposed at the U-bend to assist the prevention of jamming of the cans at the bend. The rail 22, which extends in the direction of the curved channel, is crown-shaped, and it has a toothed cam 23 projecting vertically in the space between each adjacent pair of rollers 17, as shown in Figure 1B. The leading edge of the cam 23 is inclined at an acute angle of about 30° to the horizontal, and the cam itself is positioned at a radius of about three-quarters the radius of the U-bend. This extends the effective channel length of the U-bend at the U-bend, allowing a separation between cans, preventing them from locking together. Each successive can is raised, and possibly rocked inwardly, and is then dropped to assume its original level and orientation before reaching the next cam 23. Thus each can is partially separated from its neighbours, preventing jamming from occurring.

Clearly it is possible to replace the radially-extending rollers 17 with stationary elements, such as fixed radially-extending rails or spokes, relying on the jiggling rail 22, or a similar device for extending the effective channel length.

The apparatus of Figures 1 and 2 is preferably all manufactured from plastics material with the minimum of component pieces, for economy and for lightness in weight. The external faces of the outer walls 18 may be formed with projections or recesses to enable adjacent units 10 to be coupled together, and similar complementary formations may be formed on the top walls 21 and the floor plates 20 to allow stacking.

In use, the whole channel, or at least a major part of the channel, extends within a refrigerated compartment, for the chilling of stock items 11. In use, each individual unit 10 is stocked with a respective type of stock item; to facilitate this, the appropriate identity of the stock item may be indicated at the inlet 13, for example. In order to withdraw an item from the outlet 14 of the channel, a replacement item of the same type, or a dummy item if necessary, is pushed into the inlet 13, causing the row of stock items to be indexed by one unit in the direction of the channel. The force of insertion is transmitted by successive stock items

and meets a reaction force from the semi-cylindrical portion of the outer wall 18. This reaction force ensures that the stock items are returned through a half turn and force the next item to be presented at the outlet 14. The sliding motion, which may be accompanied with rotational motion on its own axis, of each stock item 11 is assisted by the rollers 15, 16 and 17, and by the smooth surfaces of the outer wall 18 and of any intermediate wall 19.

The wall 18 may have apertures to allow access to multiple stock items 16 adjacent to the outlet 14, so that if necessary they can be removed without advancing the row along the channel. It would then be necessary to replenish the stock with a corresponding number of items at the inlet.

Although the apparatus has been described in relation to regular cylindrical objects such as cans and bottles, stock items of other shapes would of course be possible. Further, although the apparatus in this example is intended to be used horizontally, apparatus using the same principle of stock rotation and chilling may be arranged to operate with the channel extending vertically or at an incline; moreover, the channel need not be U-shaped, so long as it operates on a "first-in, first-out" principle to convey items from an inlet to an

outlet. Clearly however there are considerable advantages in having the inlet adjacent to the outlet, since the items withdrawn may then be identified with the corresponding items inserted by way of replacement.

Further, the refrigeration of items is not essential: stock rotation on work shelves could be achieved using apparatus embodying the invention.

In use, in order to provide a supply of replacement stock items for insertion into each respective inlet 13, it is preferred that a store of each respective item of stock should be situated adjacent each respective inlet 13; this is particularly important where there is a large variety of items.

Although in this example the wall is shown as extending for substantially the height of the stock items, this is not essential, and the apparatus could be more in the form of a shallow tray with a low side wall, e.g. 2.5 cm (one inch) high.

CLAIMS

1. Apparatus for stock rotation comprising a first-in, first-out channel having an inlet and outlet for a series of successively introduced stock items, a major portion of the channel constituting a bend between the inlet and outlet directions, the channel having an outer wall which provides reaction forces on the row of stock items pushed against the row end at the inlet, the reaction forces tending to index the row by one unit so as to present a stock item at the outlet.
2. Apparatus according to Claim 1 for chilling stock items and presenting them at the outlet, in which the said major portion of the channel extends within refrigeration apparatus for chilling the stock items.
3. Apparatus according to Claim 1 or 2, in which the channel is U-shaped with straight, parallel limbs defining at their respective ends the inlet and outlet.
4. Apparatus according to Claim 2 or 3, in which the channel is horizontal in use, and having a floor for supporting the weight of the stock items while allowing them to slide along the channel.
5. Apparatus according to Claim 4, in which the floor

comprises a series of rollers whose axes are transverse to the channel direction.

6. Apparatus according to claim 5, in which at least one of the transverse rollers is split into two relatively rotatable rollers.

7. Apparatus according to any preceding claim, in which the major portion of the channel constituting the bend has a floor which includes a camming surface extending in the direction of the channel for jiggling successive stock items to cause their relative motion to prevent jamming.

8. Apparatus according to any preceding Claim, in which the inlet and outlet are adjacent and in which the stock items are visible.

9. Refrigeration apparatus comprising a plurality of adjacent units each consisting of apparatus in accordance with any preceding claim.

10. Apparatus for storing, chilling and displaying stock items, comprising refrigeration apparatus according to Claim 9, whose inlets for stock items are disposed adjacent stores for the respective stock items.

11. Apparatus for stock rotation and chilling,
substantially as described herein with reference to the
accompanying drawings.